Introduction to Electronics: The Single-Pole Single-Throw Switch

Written By: KRA5H

PARTS:

- Battery Holder (2-AA) # 6SC B1 (1)
- Base Grid (11” x 7.7”) # 6SC BG (1)
- 6V Lamp Socket (With Bulb) # 6SC L2 (1)
- Slide Switch # 6SC S1 (1)
- Conductor with 3-snaps # 6SC 03 (1)
- Conductor with 2-snaps # 6SC 02 (4)

SUMMARY

In this article you will learn how a single-pole single-throw switch works. You will learn how to build a simple circuit and to understand Direct Current (DC).

I used Snap Circuits to demonstrate this circuit because it is easy for you to understand what’s going on in a circuit as you learn by doing; that is, you learn about electronics by actually building the circuits.

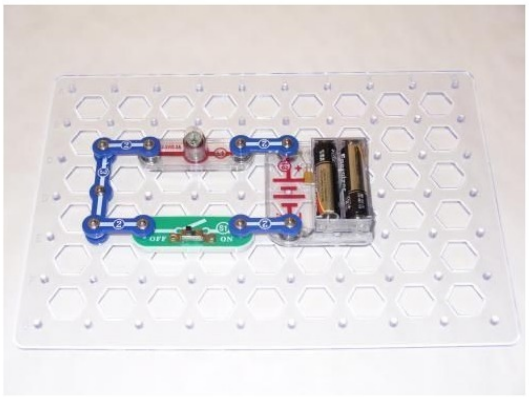
Snap Circuits is an educational toy that teaches electronics with solderless snap-together

electronic components. Each component has the schematic symbol and a label printed on its plastic case that is color coded for easy identification. They snap together with ordinary clothing snaps. The components also snap onto a 10 X 7 plastic base grid analogous to a solderless breadboard.

All the kits include manuals printed in color with easy-to-follow diagrams to assemble the projects. The illustrations for each project look almost exactly like what the components will look like on the base grid when finished. Because the electronic symbol is printed on each electronic component, once the project is completed it will look almost exactly like an electronic schematic.

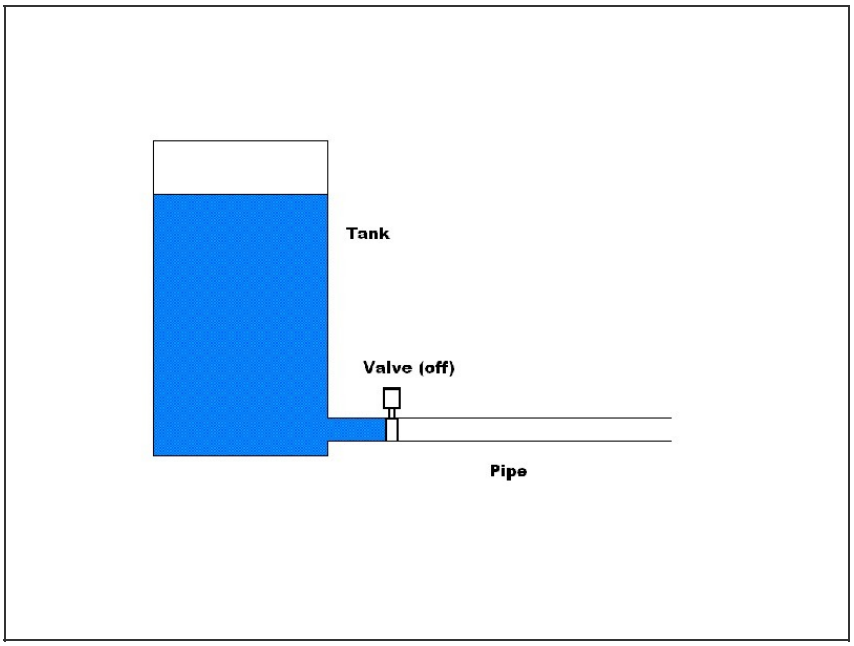
All parts come from the Snap Circuits Extreme 750 set available at RadioShack or individual parts can be ordered here.

Step 1 — Introduction to Electronics: The Single-Pole Single-Throw Switch



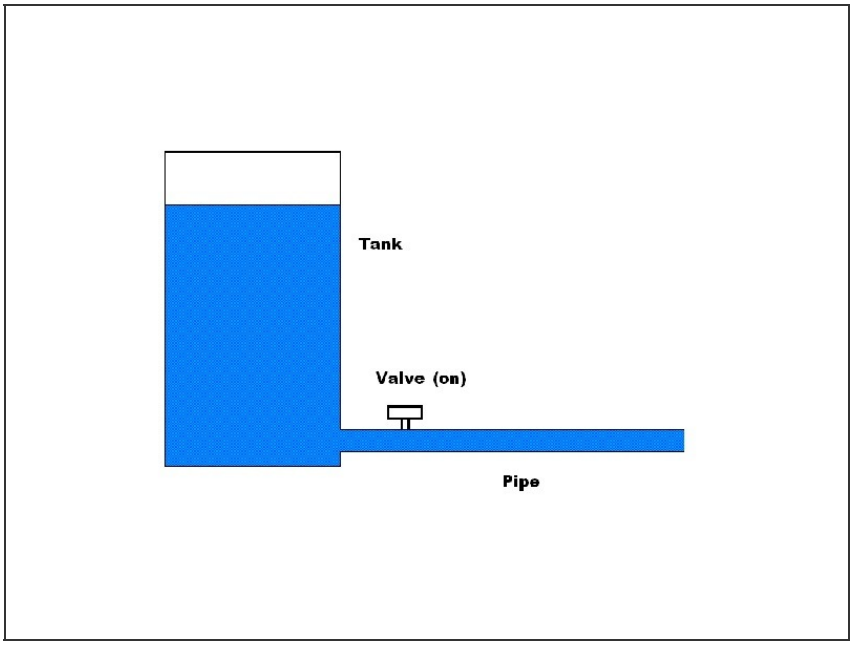
- When you enter a dark room, what is the first thing you usually do? Look for a light switch. You flip the switch on and let there be light.
- A switch is probably the simplest electronic device. When the switch is off, the circuit is open and no electricity can flow.
- The Single-Pole Single-Throw switch, or “Slide Switch” (S1) as it is labeled in Snap Circuits, is similar to a light switch in your home that you flip to switch it on.
- Current then flows from the positive side of the battery (marked with a "+" sign) to ground (marked with a "-" sign).
- The switch will remain on until you slide the switch to the "off" position.

Step 2



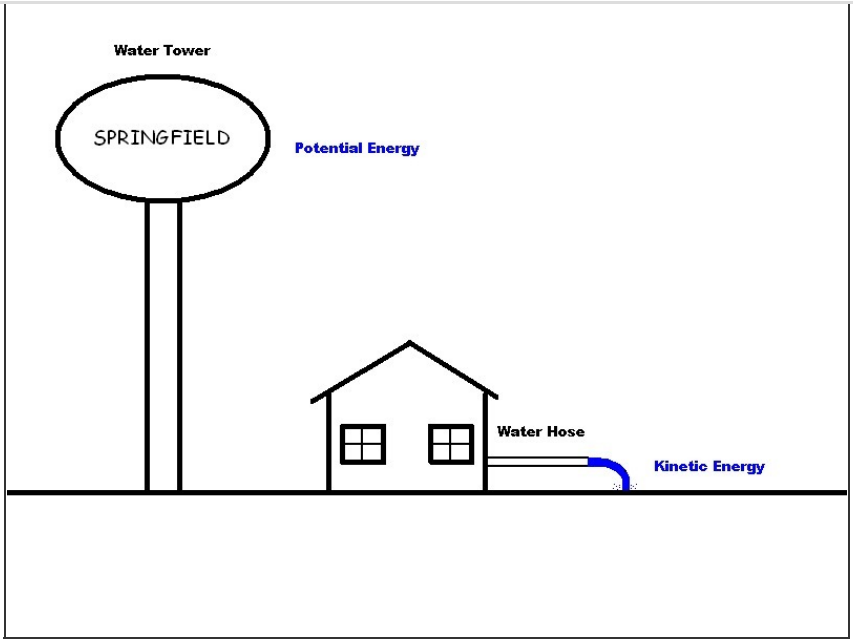
- To use the water pipe analogy, imagine a tank of water with a pipe connected at the bottom.
- To stop the water from running out of the tank, we can add a valve– more commonly called a faucet.
- When the valve is off, no water can flow through the pipe.

Step 3



- Conversely, when the valve is on, water can drain out of the tank and flow through the pipe.

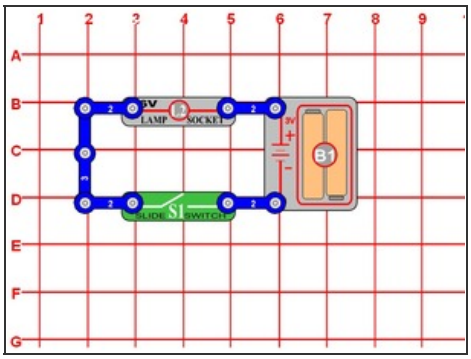
Step 4

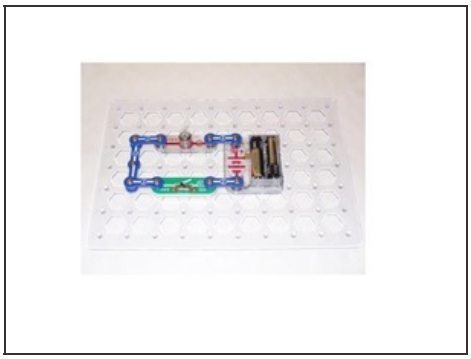


- In a DC (direct current) circuit where the electricity can only flow in one direction, we can think of a battery as a storage tank like the water tower in your neighborhood. If nobody turned on their faucet, the water in the tower would just sit there...forever.
- Physicists like to think of this as "potential energy."
- Like a boulder at the top of a hill, it will just sit there, forever, until someone pushes it over the hill or an earthquake shakes it from the top of the hill or erosion undermines it starting it to roll down the hill.
- When the boulder is rolling down the hill, physicists like to think of this as kinetic energy.
- So, the water will just sit in the top of the water tower until you turn on the faucet to your water hose. The water will then flow from the top of the water tower through your water hose and then on to the ground.
- You can then think of the flow of water as kinetic energy and this kinetic energy can be used to do useful work.
- When no circuit is connected to your battery, it is like a storage tank, or potential energy.
- When a circuit is connected to your battery you can think of it as

current flowing from the positive side of the battery (marked with a "+" sign) to ground (marked with a "-" sign) and you can think of the flow of current as kinetic energy that can be used to do useful work such as light up an incandescent bulb.

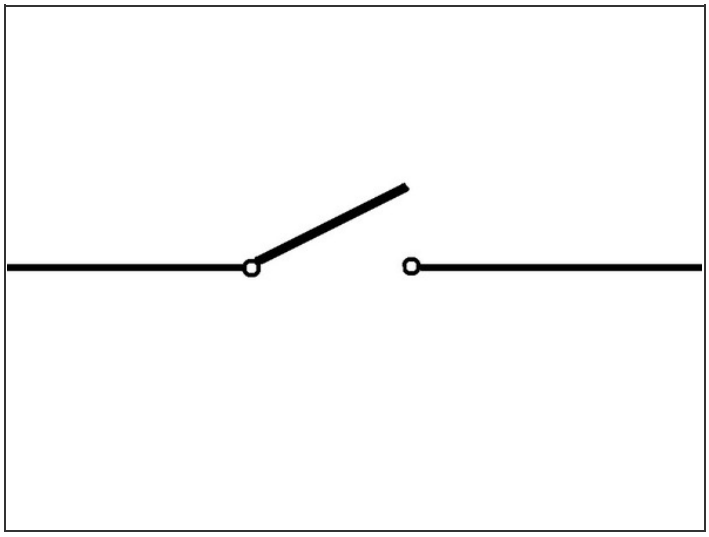
Step 5

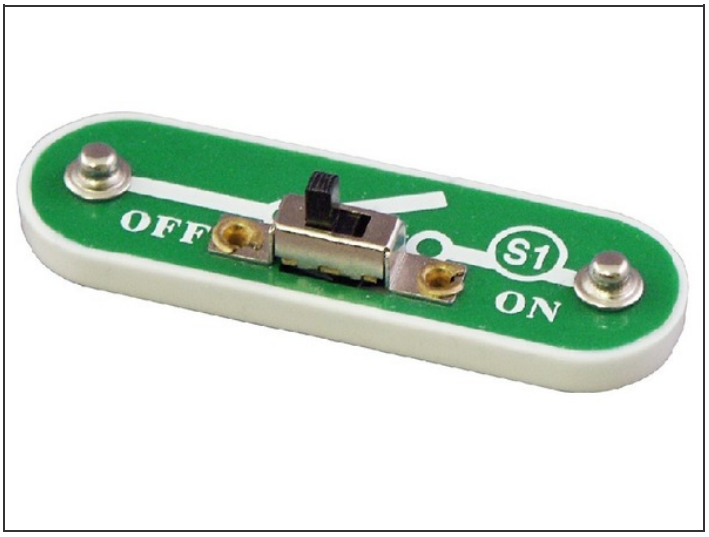




- Build the circuit shown--the photographs show the step-by-step build.
- If you would like to design your own circuits, you can download the Snap Circuits Designer from this web page.
- When you have finished building the circuit, move the Slide Switch (S1) from the off position to the on position and the lamp will light up.

Step 6





- This is the electronic symbol for the switch so that you will be able to recognize it on an electronic schematic.
- I've also included a photo of the Snap Circuits Slide Switch (S1) block (source).
- To see an example of a Snap Circuits manual, and to review the circuit source, go here and scroll down to Project #1.

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